

Aero Design Ltd.

Work Order Control Sheet

Work Order#: 2017-99 Date Opened: 12 June 2017 Title: Fabrication

Aircraft OEM: Eurocopter Aircraft Model: AS350 Product Type: Bicycle Rack Product Model: Cam/Up. Roller/Low. Roller Quantity: 90/90/90

Work Order Contents

	Initial or N/A
Work Order/Build Sheets (Procedures Provided)	DM
Additional Work Sheets (Standard Practice)	N/A
Drawings (See List Below)	DM
Parts Distribution Sheet	N/A
Sub Component Tags	N/A
Completed Certification	JC
Time Sheet (R&D)	N/A
Notes	N/A

Build Sheet Contents

	Initial or N/A
Tasks Initialled	JC
Dual Inspections Initialled	N/A

Drawing List

Drawing #	Rev #	Description	Initial or N/A
100222	0	Cam	DM
100223	0	Rollers	DM

Traveller

Initial or N/A

Component Completion

	As Instructed
Quantity Complete on This Work Order	81/85/89
Quantity Incomplete on This Work Order	N/A
Further Processing Required Before Release	N/A
Release to Stock as Components	N/A

Certification

	Initial or N/A
Form One Completed	N/A
Serviceable (Green) Tag Completed	DM/JC
In Process (Yellow) Tag Completed	KB
Unserviceable (Red) Tag Completed	KB
Parts Placed in Stores for Distribution	JC

Additional Documentation

	Initial or N/A
Documentation of a minor change	N/A
Non-Conformance Report Required	N/A
Service Difficulty Report Required	N/A

Billing

	Initial or N/A
Local (Aero Design)	JC
Research and Development	N/A
Third Party	N/A

Notes:

Qty Ord.	Qty Comp.	Part
90	81	100223-01 Upper Roller
90	85	100223-02 Lower Roller
90	89	100222-03 Cam

Work performed by:

Print: D. Martyn

Sign: 

SCA: AD05

Date: 31-Jul-17

ICC / Dual Inspection performed by:

Print: N/A

Sign:

SCA:

Date:

Work Order closed by:

Print: J. Clarke

Sign: 

SCA: AD02

Date: 01-Aug-17

Approved Manufacturing Facility 73-04

Form 200/03

Rev. Original 23 Sep 2014



Aero Design Ltd.

9888 A Malaspina Rd. Powell River, BC, V8A 0G3

Phone: 604-483-2376 Fax: 604-483-2372 E-mail: info@aerodesign.ca

AMF 73-04

Nomenclature: CAM Roller No. of pieces: 89

Manufacturer: Aero Design LTD.

Part No.: 100222-03 Serial/Batch No.: N/A

TTSN: N/A TSO: N/A Rem.: N/A

Work Order No.: 2017-99

Remaining Tasks to be Performed: CNC operations ✓

Signature: Kathy Berens

Date: 28 July 2017 Lic. No. / SCA AD-10

In Process



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AMF 73-04

In Process

Remarks

Complete, Green tag issued JC 01 AUG 2017

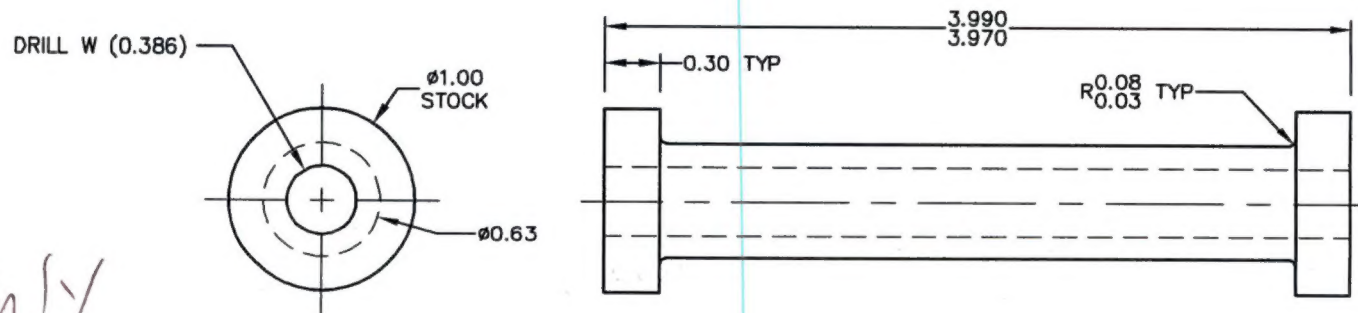
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REV.	DESCRIPTION OF CHANGE	INITIALS	DATE
0	INITIAL ISSUE		

NOTES


1. REMOVE ALL BURRS AND BREAK SHARP EDGES.

WO# 2017-99



01 UPPER ROLLER

Roughly
7 mins.
each
total cuttings
machining and
paper work.

	100223-01	01	UPPER ROLLER	BLACK ACETAL	ASTM D6778	1.0 ROD
01	PART NO.	ITEM	DESCRIPTION	MATERIAL	MATERIAL SPEC	STOCK SIZE
QTY	LIST OF MATERIALS					
	APPROVALS		DATE	 <div>AERO DESIGN LTD. 9888A MALASPINA ROAD POWELL RIVER, BC, CANADA, V8A 0G3 TEL: 604.483.2376 www.aerodesign.ca</div>		
	DRAWN: JEFF CLARKE		04 SEPT 2015			
	CHECKED: JASON REKVE		04 SEPT 2015			
	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ON: DECIMALS ANGLES X.XXX ±0.010 ±1/2" X.XX ±0.03 X.X ±0.1			AIRBUS HELICOPTERS AS350/AS355/EC130 BICYCLE RACK INSTALLATION ROLLER FABRICATION		
				SCALE 1 : 1	DWG. SIZE	DWG. NO.
			SHEET 1 OF 2	A4	100223	0

Aero Design Ltd.
Component Fabrication

Work Order Number: 2017-99 100223-01 Upper Roller

Date: June 12/2017

Notes:

Set speed to 1030 RPM.

Set feed to .004" per inch per rev.

Maximum depth of cut not to exceed .100" per pass

No coolant required

Step	Tasks	SCA
1.	Record material PO below	AD-05
2.	Cut 1" solid round bar acetyl to 4.125" in length	OK
3.	Face, center drill and bore hole 2.5" deep using "W" drill at one end only.	AD-05
4.	Set collet stop to 1" depth	AD-05
5.	Insert finished end of part into collet ensuring contact with the collet stop.	AD-05
6.	Set lathe bed stop to finished part length IAW drawing 100223 Item 01	AD-05
7.	Face end with a maximum depth of cut not to exceed .100" until contact with lathe bed stop is achieved	AD-05
8.	Center drill, bore 2.5" deep using a letter "W" drill.	AD-05
9.	Place mark at .280" from each end of the part	AD-05
10.	Set collet stop .200"	AD-05
11.	Insert end of part into collet ensuring contact with the collet stop.	AD-05
12.	Support the outboard end of the part utilizing the live center in the tail stock	AD-05
13.	Using the HSS parting tool, machine area between lines to finished dimensions IAW drawing 100223 Item 01.	AD-05
14.	Deburr and inspect finish and dimensions of final part.	AD-05
15.	Tag completed parts IAW Aero Design MPM.	AD-05

← Jason

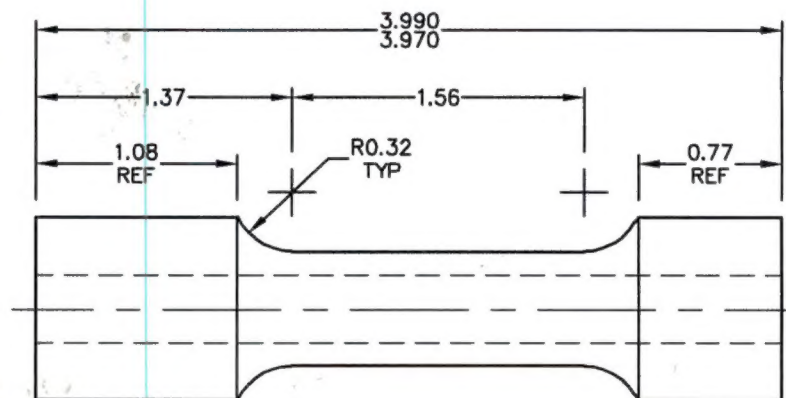
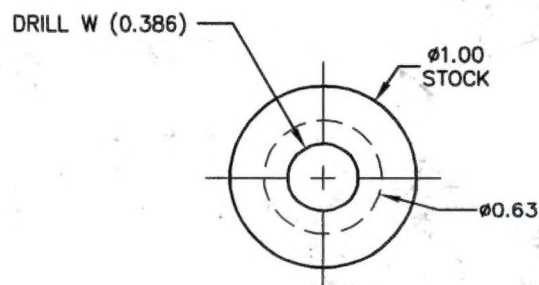
Material Purchase Order Number 17016
Batch Quantity 81

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REV.	DESCRIPTION OF CHANGE	INITIALS	DATE
0	INITIAL ISSUE		


NOTES

1. REMOVE ALL BURRS AND BREAK SHARP EDGES.



② LOWER ROLLER

	100223-02	02	LOWER ROLLER	BLACK ACETAL	ASTM D6778	1.0 ROD
02	PART NO.	ITEM	DESCRIPTION	MATERIAL	MATERIAL SPEC	STOCK SIZE
QTY	LIST OF MATERIALS					

APPROVALS		DATE			AERO DESIGN LTD. 9888A MALASPINA ROAD POWELL RIVER, BC, CANADA, V8A 0G3 TEL: 604.483.2378 www.aerodesign.ca		
DRAWN:	JEFF CLARKE	04 SEPT 2015					
CHECKED:	JASON REKVE	04 SEPT 2015					
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ON: DECIMALS ANGLES X.XXX ±0.010 ±1/2" X.XX ±0.03 X.X ±0.1				AIRBUS HELICOPTERS AS350/AS355/EC130 BICYCLE RACK INSTALLATION ROLLER FABRICATION			
SCALE 1 : 1		DWG. SIZE		DWG. NO.		REV.	
SHEET 2 OF 2		A4		100223		0	

Roughly
7 min. each
total cutting,
machining and
paper work.

Aero Design Ltd.
Component Fabrication

Work Order Number: 2017-99 100223-02 Lower Roller

Date: June 12/2017

Notes:

Set speed to 1030 RPM.

Set feed to .004" per inch per rev.

Maximum depth of cut not to exceed .100" per pass

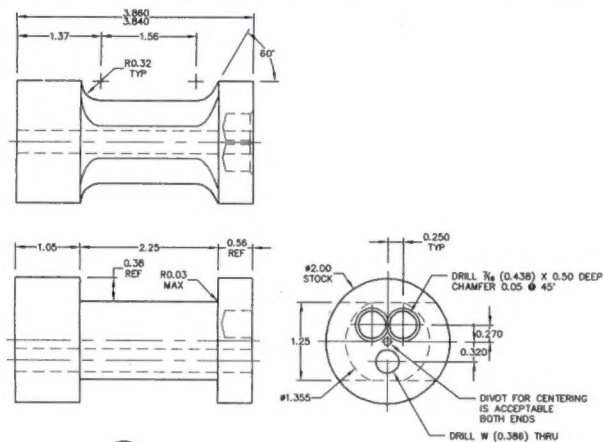
No coolant required

Tasks	SCA
1. Record material PO below	AD-05
2. Cut 1" solid round bar acetyl to 4.125" in length	AD-05
3. Face, center drill and bore hole 2.5" deep using "W" drill at one end only.	AD-05
4. Set collet stop to 1" depth	AD-05
5. Insert finished end of part into collet ensuring contact with the collet stop.	AD-05
6. Set lathe bed stop to finished part length IAW drawing 100223 Item 02	AD-05
7. Face end with a maximum depth of cut not to exceed .100" until contact with lathe bed stop is achieved	AD-05
8. Center drill, bore 2.5" deep using a letter "W" drill.	AD-05
9. Place mark at 1.08" from one end of the part	AD-05
10. Place mark at .77" from the opposite end of the part	AD-05
11. Set collet stop .600"	AD-05
12. Insert the long end of part into collet ensuring contact with the collet stop.	AD-05
13. Support the outboard end of the part utilizing the live center in the tail stock	AD-05
14. Using the .320 grooving tool, machine area between lines to finished dimensions IAW drawing 100223 Item 02	AD-05
15. Deburr and inspect finish and dimensions of final part.	AD-05
16. Tag completed parts IAW Aero Design MPM.	AD-05

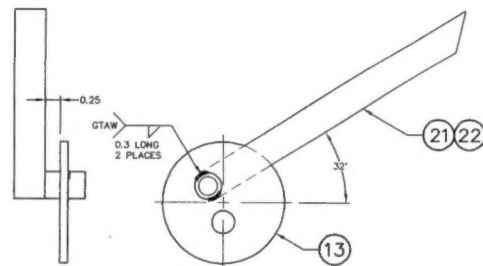
← Jason

Material Purchase Order Number 17016
Batch Quantity 85

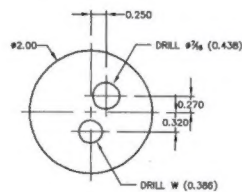
WO# 2017-99



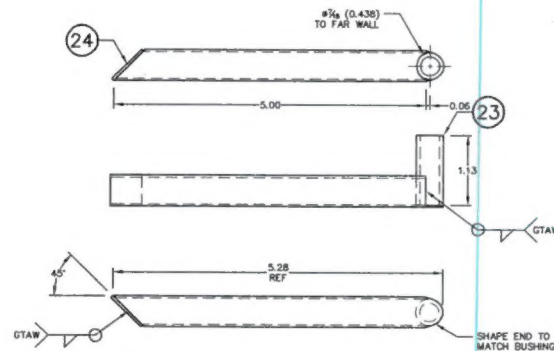
③ CAM



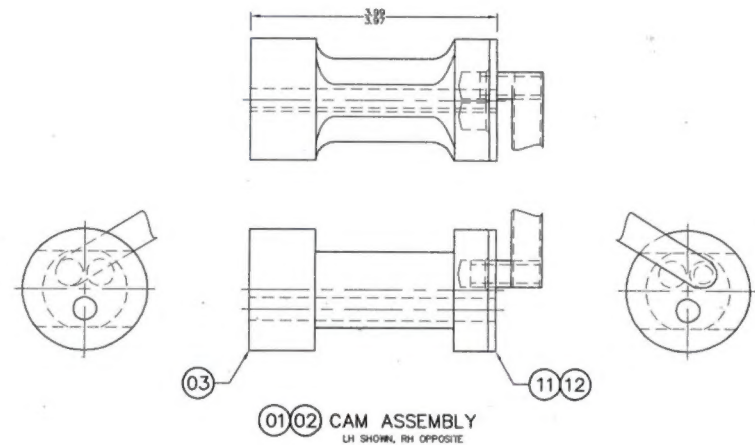
11 12 DRIVE PLATE ASSEMBLY
LH SHOWN, RH OPPOSITE



⑬ DRIVE PLATE




(21)(22) HANDLE ASSEMBLY
LH SHOWN, RH OPPOSITE



①② CAM ASSEMBLY
LH SHOWN, RH OPPOSITE

[illegible]

		APPROVALS		DATE				AERO DESIGN LTD.	
		DRAWN: JEFF CLARKE		29 JUNE 2016				9080A MALASPINA ROAD	
		CHECKED: JASON REKVE		29 JUNE 2016				POWELL RIVER, B.C. CANADA, V8A 0G5	
								TEL: 604-663-3975 www.aerodesignltd.com	
		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ARE:				AIRBUS HELICOPTERS AS350/AS355/EC130			
		DECIMALS ANGLES				BICYCLE RACING INSTALLATION			
		X.XXX ±0.010 ±1/2"				CAM FABRICATION			
		X.XX ±0.03							
		X.X ±0.1							
		SCALE 1 : 1				DIM. SIZE		DIM. NO.	
		SHEET 1 OF 1				A1		100222	
								REV.	
								0	

Manual Mill

19.	Insert two rollers on side in mill vice clamping on ends	KB
20.	Using a sharp 1" slot mill at 1000 RPM, machine a .055" deep flat on the top side of the roller extending from the top of each radius	KB
21.	Rotate parts resting the flat produced in the previous step on a flat bar to ensure upper and lower flats are parallel	KB
22.	Using a sharp 1" slot mill at 1000 RPM, machine a .055" deep flat on the top side of the roller extending from the top of each radius	KB

CNC Mill

23.	Install special vice jaws for bike rack cam in CNC vice using 1" aluminum alignment rods to ensure front and rear jaws are parallel	KB
24.	Remove alignment rods and install 2" aluminum reference tool to assist in finding center in X and Y axis using standard practices	KB
25.	Using the point finder, locate the center of the reference tool using standard practices	KB
26.	Using the point finder, located the top of the reference tool using standard practices	KB

Note:

Add 1.64" to Z axis to set 0 for final work height

27.	Insert the part in the vice jaws fully seated at the bottom with the dimple facing up.	KB JC
28.	Install 1/2" x 3/4" clamp up bars and clamp down fully	KB JC
29.	Lightly tap the top of the part with a soft faced hammer to ensure it is fully seated	KB JC
30.	Run CNC program	KB JC
31.	Remove part from vice.	KB JC
32.	Deburr and inspect finish and dimensions of final part.	JC
33.	Tag completed parts IAW Aero Design MPM.	JC

Material Purchase Order Number 17016
Batch Quantity 90

-1 incorrect setup.

2017-99

Aero Design Ltd.
Component Fabrication

Work Order Number: 2017-99 x90 100222-03 Cam

Date: June 14/2017

Notes:

Set speed to 1030 RPM.

Set feed to .040" per inch per rev.

Maximum depth of cut not to exceed .100" per pass

No coolant required

Manual Lathe

Tasks	SCA
1. Record material PO below	AD-05
2. Cut 2" solid round bar acetyl to 4.125" in length	OK
3. Face, break corner and using center drill dimple one end only.	AD-05
4. Insert 1" round bar into 1" collet protruding 1" to be used as stop	AD-05
5. Install 3 jaw chuck over collet/stop assembly	AD-05
6. Insert finished end of part into collet ensuring contact with the collet stop.	AD-05
7. Set lathe bed stop to finished part length IAW drawing 100222 Item 03	AD-05
8. Face end with a maximum depth of cut not to exceed .100" until contact with lathe bed stop is achieved	AD-05
9. Place mark at .560" from dimpled end of the part	AD-05
10. Place mark at 1.05" from opposite end of the part	AD-05
11. Set collet stop .200"	AD-05
12. Insert non-dimpled end of part into chuck ensuring mark is clear of the chuck face a minimum of 1/4"	AD-05
13. Rotate the compound slide to 30 degrees and lock down	AD-05
14. Place mark on compound slide dial to indicate 0	AD-05
15. Set lathe bed stop to match mark closest to the chuck.	AD-05
16. Support the outboard end of the part utilizing the live center in the tail stock adjusting the stock so the carriage contacts it at the outer mark on the part.	AD-05
17. Using the .320 grooving tool, machine area between lines to finished dimensions IAW drawing 100222 Item 03	AD-05
18. With the carriage at the tail stock stop, rotate the compound dial counter clockwise until clearing the part, thereby imparting a 60 degree angle in the outer end	AD-05

Note:

Return compound dial to 0 mark before each pass



Aero Design Ltd.

9888 A Malaspina Rd. Powell River, BC, V8A 0G3

Phone: 604-483-2376 Fax: 604-483-2372 E-mail: info@aerodesign.ca

AMF 73-04

Nomenclature: Cam

Manufacturer: Aero design LTD

Part No.: 100222-03 Serial / Batch No.: P01706

TTSN: N/A TSO: N/A Rem.: N/A

Removed From: PLA

Reason For Removal: Manufacturing error

A/C Hours at Removal: N/A WO.# 2017-99

Signature: Kathy Boran

Date: 27 July 2017 KB 2017 Lic. No. / SCA AD-10

Unserviceable



Aero Design Ltd.

9888 A Malaspina Rd. Powell River, BC, V8A 0G3

Phone: 604-483-2376 Fax: 604-483-2372 E-mail: info@aerodesign.ca

AMF 73-04

Unserviceable

Remarks

PART DESTROYED JC 01 AUG 2017

1. Approving Civil Aviation Authority/Country Transport Canada		2. AUTHORIZED RELEASE CERTIFICATE FORM ONE			3. Form Tracking No. 2017-0312
4. Organization Name and Address AERO Design Ltd. – 9888A Malaspina Road, Powell River, BC, V8A 0G3					5. Work Order/Contract/Invoice WO 2017-99
6. Item	7. Description	8. Part Number	9. Qty.	10. Serial/Batch No.	11. Status/Work
1.	Upper Roller	100223-01	3	N/A	New
2.	Lower Roller	100223-02	3		
12. Remarks					
13a. Certifies that the items identified above were manufactured in conformity to: <input checked="" type="checkbox"/> Approved design data and are in condition for safe operation. <input type="checkbox"/> Non approved design data specified in block 12.			14a. <input type="checkbox"/> CAR 571.10 Maintenance Release <input type="checkbox"/> Other regulation specified in block 12. Certifies that unless otherwise specified in block 12, the work identified in block 11 and described in block 12, has been performed in compliance with the Canadian Aviation Regulations.		
13b. Signature <i>Jeff Clarke</i> AD 73-04 02		13c. Approved Organization Number AMF 73-04		14b. Signature	
13d. Name Jeff Clarke - AD02		13e. Date (dd/mmm/yyyy) 12 Aug 2017		14c. Approved Organization Number	
				14d. Name	
				14e. Date (dd/mmm/yyyy)	
Installer Responsibilities					
This certificate does not constitute authority to install. Installers working in accordance with the national regulations of a country other than that specified in block 1 must ensure that their regulations recognize certifications from the country specified. Statements in blocks 13a or 14a do not constitute installation certification. In all cases, the technical record for the aircraft must contain an installation certification issued in accordance with the applicable national regulations before the aircraft may be flown.					

BLACKCOMB HELICOPTERS

12/08/17



WO# _____

[illegible]

Lower Rollers
Taken For
2018-56